Diet and lifestyle interventions for obese pregnant women

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Improvement of health outcomes in obese and overweight individuals is a worldwide research priority. Lifestyle interventions in pregnancy have the potential to minimise complications in both mother and baby.[1] In *The Lancet Diabetes & Endocrinology*, Lucilla Poston and colleagues in The UPBEAT Trial Consortium[2] report findings of one of the largest randomised trials to date to assess the effects of lifestyle interventions in obese pregnant women.

In the UPBEAT study, Poston and colleagues assessed a complex behavioural intervention based on a healthy diet and increased physical activity and compared it with standard antenatal care in the UK. The study focused primarily on the incidence of gestational diabetes and large-for-gestational-age babies; the authors also assessed other clinically important outcomes such as pre-eclampsia, mode of delivery, and preterm birth, as well as neonatal outcomes, maternal and fetal weight-related outcomes, glycaemic status, dietary intake, and measures of physical activity.

The intervention in obese pregnant women did not reduce the incidence of gestational diabetes (risk ratio 0·96, 95% CI 0·79–1·16; p=0·68) or large-for-gestational-age babies (1·15, 0·83–1·59; p=0·40). No differences between groups were noted for several of the other clinical outcomes, measures of glycaemic status (including blood glucose concentrations), or the need for insulin. Total gestational weight gain was lower in the intervention group than in controls (mean difference −0·42 kg, 95% CI −0·75 to −0·09; p=0·013), an effect seen by 28 weeks of gestation. In women who received the intervention, a significant improvement was reported in dietary pattern, and physical activity was also increased.

The UPBEAT trial has added to growing evidence showing the ineffectiveness of mixed interventions based on diet and lifestyle on the incidence of gestational diabetes and large babies, particularly in overweight and obese women. The study findings accord with those of previous systematic reviews,[3] in which mixed interventions based on both diet and physical activity did not reduce the incidence of gestational diabetes. Interventions based mainly on diet, some with restricted energy intake, have shown a beneficial effect in prevention of gestational diabetes.[1] However, the studies were small and did not assess gestational diabetes as a primary outcome.

The LIMIT trial, which included overweight and obese pregnant women, also reported no beneficial effect of diet and physical activity on large-for-gestational-age fetuses or gestational diabetes.[4] In a Cochrane review,[5] a reduction in excess weight gain during pregnancy was reported with diet and lifestyle interventions, but gestational diabetes was not assessed as an outcome. Although a lower weight gain was noted in the intervention group compared with standard care by 28 weeks of gestation in the UPBEAT study, this finding did not translate into clinical benefits.

Poston and colleagues noted a possible reluctance of obese women to follow the intervention, with only a fifth of all eligible mothers participating in the trial. Whether women with a previous history of gestational diabetes will be more willing to adopt the planned intervention, or whether there will be a differential effect in this high-risk group, is not known. Furthermore, in the absence of reliable biomarkers to assess adherence, the actual proportion of mothers who followed the dietary advice can only be estimated from patient-reported dietary questionnaires.

Currently in the USA and many other countries, pregnant women are recommended various weight gain targets during pregnancy according to their BMI status.[6] In the UK, NICE (The National Institute for Health and Care Excellence) recommends referral of obese pregnant women to a dietician or a health-care professional but does not recommend regular weighing in pregnancy.[7] Based on the UPBEAT study findings, a change in current UK guidelines is not needed. Women should be informed that although a healthy diet and lifestyle could minimise weight gain in pregnancy, there is no robust evidence for improvement in outcomes such as gestational diabetes or large-for-gestational-age babies. However, a reduction in excess weight gain in normal weight and overweight mothers has the potential to decrease postpartum weight retention and minimise the risk of beginning future pregnancies as obese individuals. Prevention of obesity needs to be prioritised equally with efforts to reduce complications in obese pregnant women.

Future research should investigate the association between clinical outcomes and weight gain within recommended targets for various BMI groups. Standardisation of reporting of outcomes is required for meaningful interpretation of evidence, and clinical applicability of findings.

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I am the chief investigator of the National Institute for Health Research project HTA–12/01/50 (effects of weight management interventions on maternal and fetal outcomes in pregnancy: individual patient data [IPD] meta-analysis of randomised trials and model-based economic evaluation). The UPBEAT study contributes data to the IPD.

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Metformin and pregnancy outcomes in obese women

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Carolyn Chiswick and colleagues should be congratulated on their EMPOWaR study in *The Lancet Diabetes & Endocrinology* examining preventive medical intervention for improvement of fetal programming during pregnancy.[1] The objective of this randomised, double-blind, placebo-controlled, trial, was to establish whether metformin use led to improvements in maternal and fetal outcomes in obese pregnant women without diabetes, in particular in birthweight, which the investigators used as a surrogate marker for long-term adverse offspring outcome. Pregnant women with a BMI of 30 kg/m^2 or more and without diabetes received up to 2500 mg daily of metformin (n=223) or placebo (n=226) from 12 to 16 weeks' gestation until delivery. Mean birthweight at delivery did not differ between the metformin group (3462 g [SD 548]) and the placebo group (3463 g [660]). The primary outcome of *Z* score of birthweight percentiles for babies delivered liveborn at 24 or more weeks' gestation and standardised for sex, parity and gestation was similar between groups and the estimated effect size of metformin on the primary outcome was non-significant (adjusted mean difference of –0·029, 95% CI –0·217 to 0·158; p=0·7597). Furthermore, metformin had no effect on prevention of gestational diabetes or maternal weight gain compared with placebo.

This well-designed study is one of the first clinical trials to investigate preventive treatment in pregnant women in hopes of providing protection for the unborn child from long-term adverse effects later in life. The Barker hypothesis conceptualised the notion of fetal programming, claiming that the foundation for medical disorders encountered in childhood and adulthood are planted during fetal life.[2] For instance, infants that have been exposed to hostile pregnancy environments, such as maternal hypertension leading to fetal growth restriction, are susceptible to developing cardiovascular disease, overt diabetes, and hypertension themselves as adults.[3] Pregnant obese women inherently provide a similarly hostile pregnancy environment. These women are at risk of excessive gestational weight gain, development of gestational diabetes, and hypertension during pregnancy, including pre-eclampsia.[4] Importantly, findings from previous studies have shown higher birthweights in offspring of obese women, which have been associated with childhood obesity.[5,6] Thus, the vicious cycle of maternal obesity passing from generation to generation is perpetuated.

Pregnancy as an opportunity to intervene and break this viscous cycle is an appealing option for all health-care providers in perinatal medicine. The bold idea that


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